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George C. Lackey

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HUSCH & EPPENBERGER, LLC

190 CARONDELET PLAZA

SUITE 600

ST. LOUIS, MO 63105-3441

EXAMINER

CLEMENT, MICHELLE RENEE

ART UNIT

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UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/631,230
Filing Date: July 31, 2003
Appellant(s): LACKEY, GEORGE C.

MAILED

DEC 27 2006

GROUP 3600

H. Frederick Rusche
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/19/06 appealing from the Office action mailed 4/22/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The summary of claimed subject matter contained in the brief is deficient. 37 CFR 41.37(c)(1)(v) requires the summary of claimed subject matter to include: (1) a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number, and to the drawing, if any, by reference characters and (2) for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters.

The brief is deficient because on page 8 of the brief the appellant states that the device provides "a *firm*, stable, horizontal support surface" and cites Specification, p. 3, lines 25-26 and p. 4, lines 1-3 as support for the statement. However the specification merely states that the device provides a "stable, *generally* horizontal support surface", there being no support for the device providing a *firm* support surface or a *completely horizontal* support surface. It is further noted that the recitation "a firearm supporting apparatus" occurs in the preamble and the structural limitations of the currently claimed device are able to stand alone.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,302,497	PADEN	2-1967
5,829,099	KOPELMAN et al.	11-1998
3,805,646	KNIGHT	4-1974
EP 618045	SCHOLL et al.	3-1994

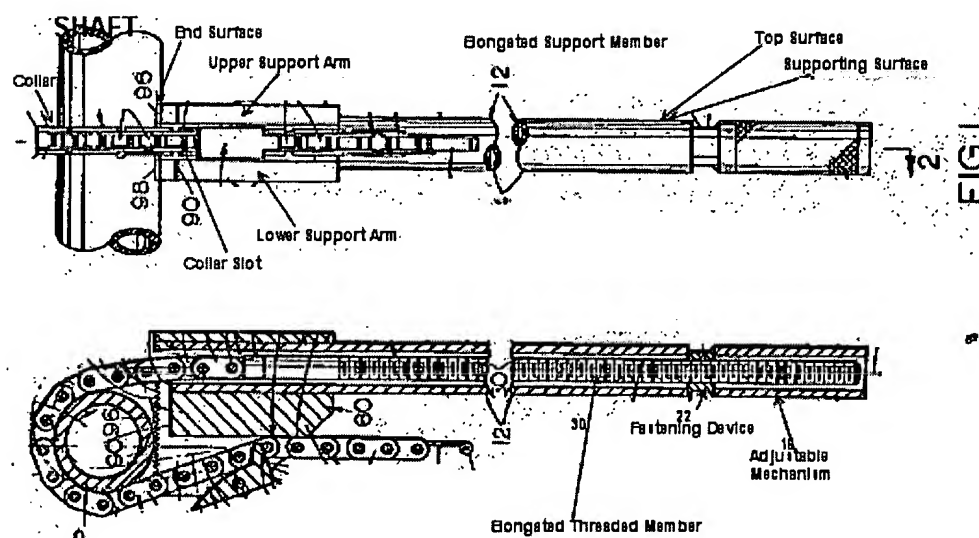
(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, and 6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Paden (US Patent # 3,302,497). Paden discloses a device including: an elongated hollow handle (i.e. elongated support member) (reference 12) having a head (i.e. an end surface) (at reference 60) and a top surface (see figures below), wherein the end surface further comprises a clamping surface (references 90, 96, 98) and the top surface further comprises a surface that could be used to support a firearm (see figures below) and the clamping surface and the supporting surface are attached with the elongated support member such as by welding (column 3, lines 73-75 and column 4, lines 1-2); a chain (i.e. a collar) (reference 50) connected with the elongated support member; and an adjustable mechanism (references 16, 30) connecting the collar with the elongated support member and adjusting the position of the collar relative to the clamping surface of the support member, resulting in movement of the collar relative to the clamping surface in a direction parallel to the elongated support member, the collar and clamping surface securing the elongated hollow handle

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(i.e. support member) to the shaft. The adjustable mechanism includes a bolt (i.e. an elongated threaded member) (reference 30) connected with the collar and the elongated support member and a fastening device (reference 22, column 3, lines 56-58) associated with the threaded member, wherein tightening and loosening the fastening device on the threaded member adjusts the position of the collar relative to the clamping surface, the clamping surface includes upper and lower support arms which defines a collar slot separating the upper and lower support arms.



Although Paden does not expressly disclose the clamping surface and the supporting surface being integral with the elongated support member, Paden does state that forward part of the handle (i.e. supporting surface) "shall be called a part of the head and it is fixed to the remainder of the head" (i.e. clamping surface) and the handle (i.e. supporting surface) (column 3, lines 64-74). It is the examiner's position that this shows that the head (i.e. clamping surface) and the supporting surface are integral with the handle (i.e. elongated support member) and it has been held that the term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. *In re Hotte*, 177 USPQ 326, (328 (CCPA 1973). However, if it does

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not clearly show such, it would have been obvious to one having ordinary skill in the art at the time the invention was made to do so, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art and Paden states that the two pieces are considered one. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893). Furthermore it is noted that [a] statements of intended use (i.e. suitable for use with shafts of varying diameters and lengths) are essentially method limitations or statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference as long as the prior reference has the ability to perform the stated function, and Paden has the ability to perform the stated function. See *In re Pearson*, 181 USPQ 641; *In re Yanush*, 177 USPQ 705; *In re Finsterwalder*, 168 USPQ 530; *In re Casey*, 512 USPQ 235; *In re Otto*, 136 USPQ 458; *Ex parte Masham*, 2 USPQ 2nd 1647. It is further noted that the recitation “a firearm supporting apparatus” occurs in the preamble; a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. The structural limitations of the currently claimed device are able to stand alone and the device of Paden has the ability to perform the claimed function of being used as a firearm supporting apparatus and has the ability to be used with shafts of varying diameters and lengths. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

See MPEP § 2114 which states:

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2nd 1647

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Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. *In re Danly*, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528.

As to limitations which are considered to be inherent in a reference, note the case law of *In re Ludtke*, 169 USPQ 563, *In re Swinehart*, 169 USPQ 226, *In re Fitzgerald*, 205 USPQ 594, *In re Best et al.*, 195 USPQ 430, and *In re Brown*, 173 USPQ 685, 688.

Claims 4, 5, and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paden as applied to claim 1 above, and further in view of Kopelman et al. (US Patent # 5,829,099).

Although Paden does not disclose the elongated support member being contoured or including a flexible material with a non-skid surface covering, Kopelman et al. does. Kopelman et al. teaches a universal ergonomic handle design, which can replace handles of various tools. The handle comprising a contoured surface, which could be described as including a concave cradle (Figures 1-4), and further includes a flexible material and is preferably textured (i.e. non-skid) to provide friction associated with good grip (column 4, lines 40-45). Paden and Kopelman et al. are analogous art because they are from the same field of endeavor: hand tools. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the ergonomic grip as taught by Kopelman et al. with the gripping device as taught by Paden. The suggestion/motivation for doing so would have been to prevent injuries as taught by Kopelman et al. at column 1, lines 25-30.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paden as applied to claim 1 above, and further in view of Knight (US Patent # 3,805,646). Although Paden does not expressly disclose the clamping surface being concave or covered by a flexible material, Knight does. Knight teaches a tool device wherein the clamping surface (reference 56) is concave and covered by a flexible material (reference 58) so that the outer surface of the pipe

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will not be marred. Paden and Knight are analogous art because they are from the same field of endeavor: hand tools. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the concave clamping surface as taught by Knight with the grippers as taught by Paden. The suggestion/motivation for doing so would have been to obtain a tool that would not mar the surface of the item that was being held as taught by Knight.

Claims 1 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scholl et al. (EP 618045). Scholl et al. discloses a device that is inherently capable of performing the claimed function of being used as a firearm supporting apparatus and is suitable for use with shafts of varying diameters and lengths, the device including: an elongated support member (reference 4) having an end surface and a top surface, wherein the end surface further comprises a clamping surface (reference 15) and the top surface further comprises a surface that could be used to support a firearm and the clamping surface and the supporting surface are integral with the elongated support member; a collar (reference 2) connected with the elongated support member; and an adjustable mechanism (reference 3) connecting the collar with the elongated support member and adjusting the position of the collar relative to the clamping surface of the support member, resulting in movement of the collar relative to the clamping surface in a direction parallel to the elongated support member, the collar and clamping surface securing the support member to the shaft. Scholl et al. discloses the claimed device but does not expressly disclose including a set of collars of varying diameters, Scholl et al. merely discloses a single collar of one diameter. However any number of collars having various diameters could be utilized with the support and clamping portions disclosed by Scholl et al. It would have been obvious to include collars of varying diameters in order to accommodate a wider variety of objects (i.e. extra long for very large objects-and selecting the appropriate one as required), since it has been

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held that the provision of adjustability, where needed, involves only routine skill in the art. It is noted that the [a) statements of intended use or field of use, b) "adapted to" or "adapted for" clauses, c) "wherein" clauses, or d) "whereby"] clauses are essentially method limitations or statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See *In re Pearson*, 181 USPQ 641; *In re Yanush*, 177 USPQ 705; *In re Finsterwalder*, 168 USPQ 530; *In re Casey*, 512 USPQ 235; *In re Otto*, 136 USPQ 458; *Ex parte Masham*, 2 USPQ 2nd 1647.

See MPEP § 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2nd 1647

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. *In re Danly*, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528.

As to limitations which are considered to be inherent in a reference, note the case law of *In re Ludtke*, 169 USPQ 563, *In re Swinehart*, 169 USPQ 226, *In re Fitzgerald*, 205 USPQ 594, *In re Best et al.*, 195 USPQ 430, and *In re Brown*, 173 USPQ 685, 688.

(10) Response to Argument

It is noted that appellant has included a nonappealable issue in footnote 1.

A1. Appellant contends claims 1, 2, and 6 were improperly rejected under 35 U.S.C. § 102(b) based on the '497 patent, on the assertion that the '497 patent does not disclose the "clamping surface and the firearm supporting surface are integral with the elongated support member".

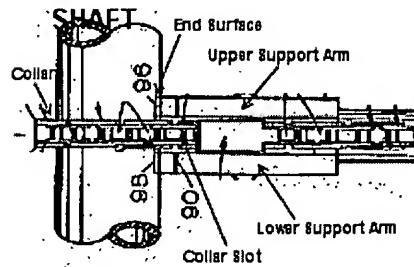
Paden states that forward part of the handle (i.e. supporting surface) "shall be called a part of the head and it is fixed to the remainder of the head" (i.e. clamping surface) and the handle (i.e.

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supporting surface) (column 3, lines 64-74). It is the examiner's position that this shows that the head (i.e. clamping surface) and the supporting surface are integral with the handle (i.e. elongated support member). Furthermore it has been held that the term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. However, if it does not clearly show such because Paden does not use the term *integral*, it would have been obvious to one having ordinary skill in the art at the time the invention was made to do so, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art and Paden states that the two pieces are considered one.

A2. Appellant further contends that '497 is non-analogous art. This is not well taken in that appellant is attempting to argue for a narrower field of endeavor than appellant is actually claiming. With regards to the 35 U.S.C. § 102(b) rejection it is noted that the reference being analogous art is not required. With respect to the 35 U.S.C. § 103 rejections it is noted that appellant's invention is directed to the general category of hand tools (i.e. a device for doing a particular job that does not use a motor, but is powered solely by the person using it). Appellant is arguing the narrow field of the intended use of the claimed device (i.e. the device intended to be used as a firearm support). The '497 patent is also in the field of endeavor of hand tools and it has the ability to perform the same intended function as the present device. Therefore the device of the '497 patent and the present invention are analogous art because they are from the same field of endeavor: hand tools.

A3. Appellant contends that the '497 patent does not disclose "a clamping surface that includes upper and lower support arms and defines a collar slot separating the upper and lower support arms", this is incorrect as seen in the figure below as copied from the '497 patent.



B. Appellant appears to repeat the arguments concerning analogous art. The examiner's response above at A2 should be referenced in regards to this argument. Furthermore it is noted that the '099 patent and the '497 patent are analogous art because they are also from the same field of endeavor: hand tools. Which is also the field of endeavor of the current application. The '099 patent is directed to an ergonomic and comfortable handle for any hand tool. Again appellant appears to be arguing the narrow field of the *intended use* of the claimed device (i.e. the device intended to be used as a firearm support). Therefore the device of the '497 patent, the '099 patent and the present invention are analogous art because they are from the same field of endeavor: hand tools. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to combine the ergonomic handle as suggested by the '099 patent with the device as disclosed by the '497 patent in order to obtain a more comfortable hand tool. The desire for a hand tool to be more comfortable to use is generally known to one of ordinary skill in the art. It is this desire for a more comfortable tool that would motivate one of ordinary skill in the art to combine or modify the teachings of the prior art. In

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response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

C. Appellant further argues that the '646 patent is non-analogous art. This issue has been previously addressed. Furthermore it is noted that the '646 patent is directed to the field of endeavor of hand tools (as acknowledged by appellant). The '497 patent, the '646 patent and the present invention are analogous art because they are from the same field of endeavor: hand tools. Again appellant appears to be arguing the narrow field of the *intended use* of the claimed tool (i.e. the device intended to be used as a firearm support). Applicant further contends that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Knight teaches a hand tool that can be used to grip an elongated pipe, tube, shaft or similar member, the hand tool having a gripping surface that is concave to fit the shape of the pipe and covered by a flexible material in order to protect the surface of the elongated pipe that is being held. The desire to protect the object being worked on is well known to one of ordinary skill in the art and it is this desire that would

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motivate one of ordinary skill in the art to combine or modify the teachings of the prior art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the concave clamping surface as taught by Knight with the tool as taught by Paden. The suggestion/motivation for doing so would have been to obtain a tool that would not mar the surface of the item that was being held as taught by Knight.

D. Appellant argues that the rejection of claims 1 and 13 as unpatentable over EP 618045 (the "Scholl patent") is improper. Appellant argues that the Scholl patent is non-analogous art, this issue has been previously addressed in that the field of endeavor of both the Scholl patent and applicant's invention is hand tools. Appellant appears to be arguing the narrow field of the *intended use* of the claimed tool (i.e. the tool intended to be used as a firearm support). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, The Scholl patent discloses the claimed device except for the device including a *set of collars of varying diameters*. While Scholl discloses that the collar can be adjusted to vary the diameter, it can only be adjusted to a certain degree depending on the size of the collar. In order to use the device on extremely large objects, additional larger collars would be required. It would have been obvious to one of ordinary skill in the art to include a set of collars of varying diameters and select the collar that was necessary to fit the object with the device disclosed by Scholl, since including a collars of varying diameters where needed involves

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only routine skill in the art. And the motivation for doing so would have been to make the device of Scholl more versatile.


(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Michelle Clement


MICHELLE CLEMENT
PRIMARY EXAMINER

Conferees:

Michael Carone

Meredith Petravick

PTO 07-1136

CY=EP DATE=19941005 KIND=A1
PN=0 618 045

STRAP WRENCH, ESPECIALLY FOR AUTOMOBILE OIL FILTER
[CLE A SANGLE, NOTAMMENT POUR FILTRE A HUILE DE VEHICULE AUTOMOBILE]

MONIQUE JOSETTE SCHOLL, et al.

UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. December 2006

Translated by: FLS, Inc.

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INVENTOR	(72): MONIQUE JOSETTE SCHOLL and DIDIER PAUL MICHEL GIRARDON
APPLICANT	(71): FACOM
TITLE	(54): STRAP WRENCH, ESPECIALLY FOR AUTOMOBILE OIL FILTER
FOREIGN TITLE	[54A]: CLE A SANGLE, NOTAMMENT POUR FILTRE A HUILE DE VEHICLE AUTOMOBILE

The present invention relates to a strap wrench of the type /1^{*} comprising a strap, in particular metallic, of which the two ends are fastened to a threaded rod, a support base, a threaded handle into which the threaded rod is screwed and is mounted so that it rotates on the support base. It applies especially to unscrewing tools for oil or gas oil filters.

In a strap wrench of this type (GB-A-2 098 903, the support base is a simple cylindrical tube. This may be acceptable for the applications provided in that document and with a strap of a material such as leather, but will not allow a gentle and precise functioning in applications requiring a relatively rigid strap, in particular metallic, for example removal of oil filters.

The goal of the invention is to furnish a strap wrench that can be used in a reliable and easy manner in such applications.

For this purpose, the object of the invention is a strap wrench of the type mentioned above, characterized in that the support body is made up of a monobloc part equipped with a central passage that the threaded rod passes through and of which the support face is cylindrical and has an axis perpendicular to the handle axis.

The strap wrench according to the invention may comprise one or several of the following characteristics:

- the central passage guides the threaded rod and is bordered by two profiled recesses that are diametrically opposed for guiding the

*Numbers in the margin indicate pagination in the foreign text.

strap, these two recesses opening out into the central passage;

- the body and the handle comprise mutual fitting means over a small fraction of the handle length and mutual axial retaining means for these two parts in fitted position;

- the axial retaining means comprise at least one ball that is spring-loaded arranged in a radial hole of one of the two parts and a circular throat provided in the other of these two parts;

- the body comprises a transverse stop made from the same material, parallel to the axis of the support face;

- the front face of the stop is at the same level as the support face of the body;

- on both sides of the passage, parallel to the axis of the contact face, the body comprises aligned transverse holes intended to receive an attached stop element, in particular a screw or a cotter pin;

- the threaded rod comprises a distal extension with reduced thickness on each side of which the two ends of the strap are fastened;

- the handle has a curved contour, with one part that is basically convex extended on each side by a concave end part;

- the handle and the proximal part of the body are essentially cylindrical and have the same diameters and are arranged end to end without penetration, coaxial and centered by the threaded rod;

- the handle and the body are in flat rotary contact and are provided with grooves at their end making possible the installation of

a circular ring with U cross section that maintains the flat contact.

Exemplary embodiments will now be described with reference to the enclosed drawings, according to which:

- Figure 1 represents, in perspective, a strap wrench according to the invention;

- Figure 2 represents a longitudinal cross section of the support body of this wrench;

- Figures 3 and 4 are views along arrows III and IV, respectively, in Figure 2;

- Figure 5 is a perspective view corresponding to Figure 2;

- Figures 6 and 7 represent two methods of fastening the ends of the wrench on the threaded rod, respectively;

- Figure 8 is a longitudinal section view of the handle of the wrench in Figure 1;

- Figure 9 is a view along arrow IX in Figure 8;

- Figures 10 and 11 are two longitudinal sections of the assembled tool shown, respectively, along two cross section planes perpendicular with respect to each other;

- Figure 12 is an exploded view, in longitudinal section of a variation;

- Figure 13 is an exploded view, along line XIII of Figure 12, of the support body of this variation;

- Figure 14 is a longitudinal section view of another embodiment of the strap wrench according to the invention;

- Figure 15 is a perspective view of the ring **105** in Figure 14;

- Figure 16 is an enlarged partial view of detail XVI of Figure 14;

- Figure 17 is a longitudinal section view of a variation of the strap wrench of Figure 14, with insert;

- Figure 18 is an external view, with semi-longitudinal section, of the tool in Figure 14, in reduced scale;

- Figure 19 is a perspective view of the same tool showing its appearance;

- Figure 20 is an external view with semi-longitudinal cross section of another strap wrench according to the invention;

- Figure 21 is a perspective view of the same tool, showing its appearance;

/2

- Fig. 22 is a partial longitudinal section of the tool in Figure 20; and

- Fig. 23 is a transverse cross section of a variation.

The strap wrench for oil filter shown in Figures 1 to 11 comprises essentially a support body **1**, a strap **2**, a threaded rod **3** and a handle **4**.

The body **1** is a molded metal part comprising, on the outside, a cylindrical support face **5** with longitudinal section (Figure 2) that is essentially circular, two end faces **6** that are flat and parallel with a shape that is generally triangular are connected, respectively, to the axial ends of face **5** and two oblique lateral faces **7** connecting the faces **6**. At its base, the body comprises a tubular joining piece **8** that ends on the inside with an annular radial shoulder **9** and that

comprises a circular throat **10** on the inside at approximately mid-height.

In its current part, above the shoulder **9**, the body has a vertical circular hole **11** with the same vertical axis X-X as the hole of the connecting piece **8** but with a clearly smaller diameter and opening into it. On the side of each face **7**, the hole **11** is bordered with a groove **12** with rectangular cross section with constant size, of which the base **13** extends progressively from axis X-X along a convex curve that is almost circular (Figure 2), starting from shoulder **9**. The lateral walls **14** of these grooves are coplanar in pairs and parallel to faces **6**.

A cross bar **15** made of the same material, forming a stop and perpendicular to the axis X-X, connects the faces **14** in the region of this axis in a location adjacent to the support face **5**. The upper face of this cross bar extends this face **5** from there.

The strap **2** is a metal strip having essentially the same size as the grooves **12** and its two ends are perforated. In the case of Figure 6, which is equivalent to the ones in Figures 10 and 11, the threaded rod **3** comprises an upper part with reduced thickness, defining two flat and parallel faces **16** pierced by a hole **17**. When the two ends of the strap are applied to the two faces **16**, the fastening of the strip on the threaded rod is ensured by means of an appropriate fastening element, e.g. a bolt **18** with nut **19**, as shown.

In the variation in Figure 7, the upper part of the threaded rod

is slotted diametrically at **20** to receive the two attached ends of the strap and the fastening is ensured by an appropriate element, e.g. a cotter pin **21** that crosses a transverse passage **22** of the slotted part of the threaded rod, as well as the holes of the strap.

Over almost all of its length, the handle **4** comprises a threaded blind hole **23** opening out on a flat and horizontal upper face **24** of the handle. On the outside the handle has, from top to bottom: a smooth cylindrical part **25** connected to the hole of joining piece **8** and ending in a radial shoulder **26**, a flange **27** adjacent to this shoulder; a short concave part **28**; a convex part **29** extending over the majority of the length of the handle; and a short concave part **30** that is shorter than part **28**. Three radial housings for the spring-loaded balls **31** are provided in the cylindrical part **25** and the lower end of the handle comprises a projection **32** in the form of a hexagon to permit actuation of the handle with the chucking tool.

To mount the tool, the two ends of the strap are introduced from the top into the body **1** on each side of the cross bar **15**, until they emerge below the body. Then the threaded rod **3** is fastened, according to one or the other of the variations of Figures 6 and 7.

Then the handle is screwed onto the threaded rod, the part **25** of the handle is fitted into the connecting piece **8**. When this part **25** stops against shoulder **9**, the balls **31** engage in throat **10**.

In this situation, the handle is connected axially with body **1** but can turn with respect to it and the two parts of the strap located

in body **1** are well guided laterally by the faces **14** of the grooves **12** and because of their elasticity apply themselves on the faces of curve **13**.

To unscrew an oil filter, the handle **4** is unscrewed in counter-clockwise direction by holding the body **1** until the free part of the strap has an adequate diameter. Then the strap is threaded on the oil filter, then the handle is screwed while holding the body **1**, which causes displacement of the threaded rod **3** toward the bottom of the hole **23**. This movement is continued until the contact face **5** is applied to the filter and the latter is firmly clamped by the strap, then the latter is unscrewed by acting on the handle perpendicular to the axis of the filter, i.e. along arrow *f* in Figure 8.

The design of the tool described above makes it possible to obtain, for a given space requirement of the tool, a long course of the threaded rod **3** which does not need to be of great length and thus a large range of useful diameters for the strap. In addition, the tool has no roughness that involves a danger of hooking on the elements close to the oil filter or injuring the operator and the curve of the handle offers great ease of use: the front and rear concave parts **28** and **30** allow an adjustment of the fingers for clamping/unclamping the handle while the main convex part **29** rests in the palm of the hand to facilitate unscrewing the oil filter.

/3

When the handle is unscrewed with respect to the body, the threaded rod **3** may leave the handle almost entirely and is guided by

hole **11**. However, there is no danger of the strap being lost due to the presence of the cross bar **15** against which the rod **3** or the strap **2** comes to rest.

It should be noted that the layout in Figure 6 actually seems more advantageous than that in Figure 7, since the spacing of the ends of the strap promotes good application of them on the base **13** of grooves **12**, in particular for working with filters having small diameters.

The variations in Figures 12 and 13 do not differ from the preceding except for in the following points.

On one hand, the cross bar **15** is replaced by two aligned holes **15A**, in which a stop is fastened that is mounted so that it cannot move such as a screw **15B** with milled head or a cotter pin **15C** (Figure 13). This makes it possible to change the strap without removing the handle of the support body.

On the other end, the connecting piece **8** is shaped as a male part and nests into a opposing hole of the handle provided at the inlet of hole **23**. For axial connection of the two parts, a slotted retaining ring **31A** is received partially in an exterior throat **10A** of the connecting piece **8** and partially in an interior throat **10B** of the opposing hole of the handle when the connecting piece **8** abuts the base of this opposing hole.

The device in Figures 14, 17, 18 and 19 mainly comprises a flexible hose or strap **101** connected at its two ends to a threaded rod

104 that slides with very little play in the molded body **102**, pierced on each side by a smooth cylindrical hole **103** flared or grooved in the plane of the cross section of a rectangular shape at the side of the filter to guide and facilitate the gliding of the flexible hose **101**.

The molded part **102**, for example of a light alloy or plastic material, comprises mainly a cylinder pierced right through with a smooth hole with diameter very slightly greater than the diameter of the threaded rod and two wings **108** and **109** making possible the creation of a partial cylindrical shape **110** having as its axis and its diameter, approximately those of the filter in order to mold to its shape to facilitate clamping. The smooth hole **103** with diameter that is very slightly greater than the diameter of the threaded rod **104** can be made up of an insert, in particular metallic **114**, see Figure 17 which could advantageously decrease the wear in part **102** and reinforce its rigidity.

The cylindrical handle **106**, pierced right through with a threaded hole, screws onto the threaded rod **104**, ensuring its traction and that of the flexible hose **101** that can tightly clamp the filter that is encircled. In the case of a handle **106** of aluminum alloy or plastic material, the threaded part can be mounted (metallic insert **113**, for example), see Figure 17, which would have the advantage of decreasing wear in handle **106** and reinforcing the rigidity. The handle **106** can be knurled to increase the adhesion of the hand.

The handle **106** and the support **102**, mainly with cylindrical shape

and of the same diameter are end to end without penetration, coaxial and centered by the threaded rod **104**.

A circular groove **111** with a small width and a depth of 2 to 4 mm is constructed at the end of part **106**, at the side of part **102** at a distance of around 3 to 5 mm. A circular groove **112** with a small width and a depth of 2 to 4 mm is constructed at the end of part **102**, to the side of part **106**, at a distance of around 3 to 5 mm. A circular ring **105**, see Figure 15 and Figure 16 (enlargement of the grooves and of part **105**) with basically U cross section, comes into position and is fixed in these two grooves preventing parts **102** and **106** from separating (flat contact) while allowing rotation of **106** with respect to **102** along the main axis of the device defined by the threaded rod **104**. The ring **105** can be of material that is sufficiently elastic so that it can be mounted by deformation or, if it is rigid, by tightening and soldering.

Rod **104** is slotted at its end, to the side of the flexible hose, in a diametric plane, with a groove of around 1 to 2 mm in width over a length from 8 to 15 mm in order to allow the engagement of the two ends of the flexible hose **101** and their fastening by a rivet **103** either by soldering or by any other economical and robust method.

A stopper **107**, screwed, forced or glued in the threaded hole of part **106**, obstructs the opposite ends of the part **102** to prevent any penetration into the device and also for esthetics and for the safety of the operator.

The flexible hose **101** can be made up of a cable or a band with small thickness with a width of 5 to 12 mm that is very resistant to traction and to folding and has good adhesion. To increase the adhesion, it is possible to either use a coating or to create roughness by embossing or cutting.

The flexible hose **101** has variable length along a range of filter diameters. The diameters of the filter generally vary from 60 to 120 mm. Several sizes should be provided.

The equal diameters of parts **102** and **106** must be chosen in such a way as to allow good handling, e.g. between 20 and 50 mm. The length of the parts **102** and **106** end to end must also ensure good gripping with the hand (total length greater than the width of a hand to form an acceptable handle) and will be a function of the engine space in the filter area and the filter diameter.

In all positions, the threaded rod **104** remains on the inside of the device. Its length is equal to two times its diameter plus the length of the handle **106** and is clearly less than the length of parts 102 and **106** placed end to end. The threaded rod **104** can penetrate into the device until it contacts stopper **107**. The threading on each side of the handle **106** promotes the course of the threaded rod **104**. Several sizes of this device can be proposed as a function of the filter diameters and of the free engine space in the filter zone.

The device of Figures 20 to 23 comprises mainly a flexible hose or strap **201** connected by the two ends to a threaded rod **204** that slides (in translation) with a radial play on the order of 2 mm in the

cylindrical hole **213**. This radial play facilitates the gliding of the flexible hose **201** for its penetration and its release.

The cylindrical hole **213** pierced right through the molded body **202** is flared or grooved in the plane of the cross section with a rectangular shape at the side of the filter to guide and facilitate the gliding of the flexible hose **201**. The cylindrical hole **213** has a recess **212** that is more or less long on the side of the handle **206**. The diameter of this recess **212** is smaller than the external diameter of the handle **206** (knurled part). The body **202** comprises two wings **208**, **209** that allow the creation of a partial cylindrical form **210** having an axis and a diameter approximately the same as those of the filter in order to mold to its shape to facilitate clamping.

The cylindrical handle **206** that is pierced right through with a threaded hole is screwed onto the threaded rod **204**, ensuring its traction and that of the flexible hose **201**, which can firmly clamp the filter that is encircled. The cylindrical handle **206** can be knurled. The cylindrical handle **208** comprises a shoulder **211** that is more or less long, which is adjusted in the recess **212** of the type H7/g6. Play **217** allows flat contact between the handle **206** and the body **202** at the end of same. The handle **206** is centered on the body **202**.

The handle **206** and the body **202**, mainly with cylindrical shape and the same diameter are end to end, coaxial and centered by the penetration of the diameter **211** with shoulder in the recess **212**. The handle **206** can turn with respect to the body **202** while remaining

centered with respect to it. The handle **206** has only one degree of freedom with respect to the body **202**, namely a rotation of the collinear axis with the axis of the hole **213**.

A semi-toroidal groove **215** is formed on shoulder **211**. A cylindrical pin **205** with its axis orthogonal to the longitudinal axis of the handle **206** prevents the part **206** from separating from the body **202** (Figure 23).

Another solution can be conceived of (Figure 22) by producing a circular groove with triangular cross section on the diameter with shoulder **211** and by using a headless screw with pointed end **214** as a stop of the handle **206** in translation with respect to the body **202**.

Other technological solutions can be conceived of to ensure this stopping.

The threaded rod **204** is slotted at its end, on the side of the flexible hose, in a diametric plane with a groove having a width of around 1 to 2 mm over a length of 8 to 15 mm in order to allow the engagement of the two ends of the flexible hose **201** and their fastening either by a rivet **203** or by a weld or by any other economical and robust means.

A stopper **207** that is screwed, forced or glued in the threaded hole of part **206** obstructs the opposite end of part **202** to prevent any penetration into the device and also for esthetics and for the safety of the operator.

In all positions, the threaded rod **204** rests on the inside of the

device. Its length is equal to one time its diameter plus the length of the handle **205**, for example, and is clearly less than the length of parts **202** and **206** placed end to end. The threaded rod **204** can penetrate into the device until it contacts the stopper **207**. The threading on each side of the handle **206** promotes the travel of the threaded rod **204**. Several sizes of device can be proposed as a function of the filter diameter and the free engine space in the filter area.

The lengths of the handle **206**, the shoulder **211**, the recess **212**, the molded body **202** and the threaded rod **204** can vary advantageously in order to ensure or lesser or greater course and thus better adaptability to different filter diameters that are currently sold.

To summarize the usage: by turning the handle **206** (rotation along its axis), the flexible hose **201** connected to the threaded rod **204** holds and clamps tightly on the filter. The operator only has to push horizontally on the handle **206**.

Characteristics of the horizontal pressure:

- Direction: orthogonal to the axis of the filter
- Point of application: about the center of handle **206**.

The device according to the invention is compact and attractive, does not have any roughness or sharp angles that present a danger of injury to the user and can be adapted to all oil and gas oil filters whether cylindrical, oval or with any elliptical shapes.

Claims

1. Strap wrench of the type comprising a strap (2; 101; 201), especially metallic, of which the two ends are fastened to a threaded rod (3; 104; 204), a support body (1; 102; 202) and a threaded handle (4; 106; 206) in which the threaded rod screws and that is mounted so it rotates with the support body, characterized in that the support body (1; 102; 202) is made up of a monobloc part equipped with a central passage (11; 103; 213) crossed through by the threaded rod and of which the support face (5; 110; 210) is cylindrical and has an axis that is perpendicular to the axis (X-X) of the handle. /5

2. Strap wrench according to Claim 1, characterized in that the central passage (11) guides the threaded rod (3) and is bordered by two profiled recesses (12) that are diametrically opposed for guiding the strap, these two recesses opening out into the central passage.

3. Strap wrench according to Claim 1 or 2, characterized in that the body (1; 202) and the handle (4; 206) comprise means for fitting mutually into each other over a small fraction of the handle length and mutual axial retaining means (31; 31A, 205; 214) of these parts in fitted position.

4. Strap wrench according to Claim 3, characterized in that the axial retaining means comprise at least one spring-loaded ball (31) arranged in a radial hole of one of the two parts (1, 4) and a circular throat (10) provided in the other of these two parts.

5. Strap wrench according to Claim 1 or 2, characterized in that the handle (106) and the proximal part of the body (102) are essentially cylindrical and have the same diameter, arranged end to

end without penetration, coaxial and centered on the threaded rod (104).

6. Strap wrench according to Claim 5, characterized in that the handle (106) and the body (102) are in flat rotary contact and are provided with grooves (111, 112) at their ends making it possible to mount a circular ring (105) with U cross section maintaining the flat contact.

7. Strap wrench according to any one of Claims 1 to 6, characterized in that the body (1) comprises a transverse stop (15) formed from the same material parallel to the axis of the support face (5).

8. Strap wrench according to Claim 7, characterized in that the front face of the stop (15) is on the same level as the support face (5) of the body (1).

9. Strap wrench according to any one of Claims 1 to 6, characterized in that on both sides of the passage (11), parallel to the axis of the support face (5), the body (1) comprises aligned transverse holes (15A) intended to receive a stop element that is mounted, in particular a screw (15B) or a cotter pin (15C).

10. Strap wrench according to any one of Claims 1 to 9, characterized in that the threaded rod (3) comprises a distal extension with reduced thickness on each side of which the two ends of the strap (2) are fastened.

11. Strap wrench according to any one of Claims 1 to 10, characterized in that the handle (4) has a curved contour with a

convex main part (29) that is extended on each end by a part with concave end (28, 30).

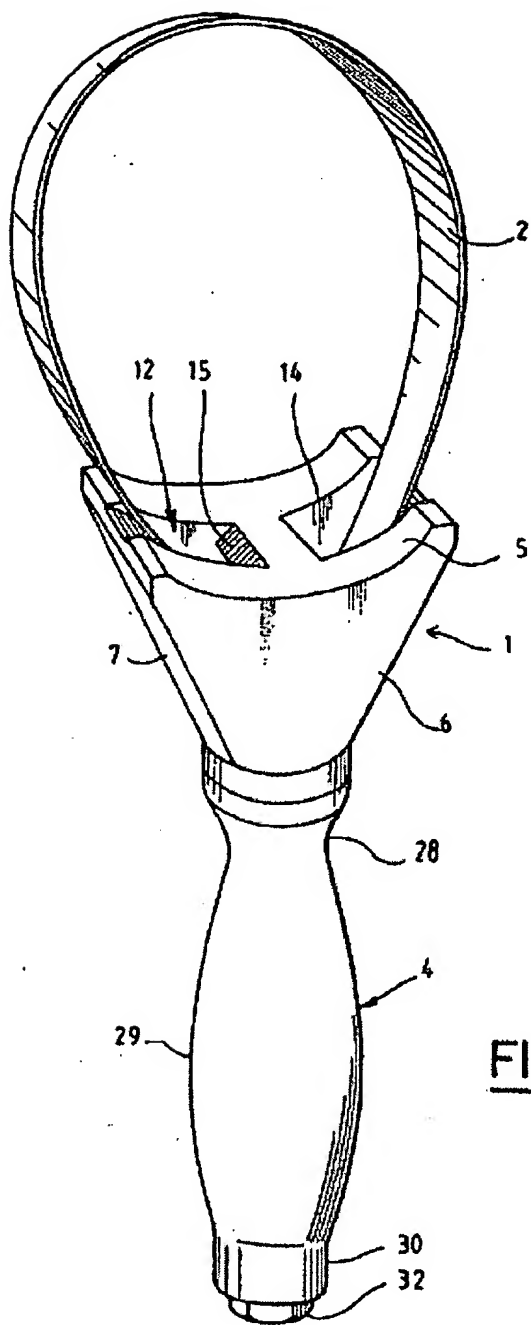


FIG.1

FIG.3

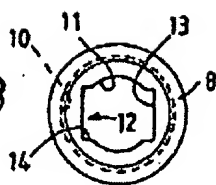


FIG.2

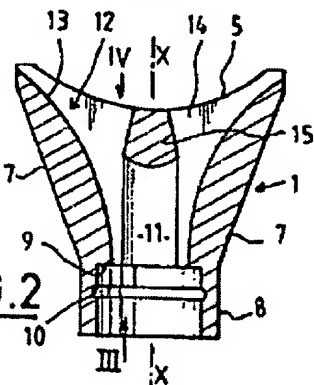


FIG.4

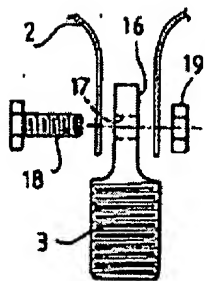
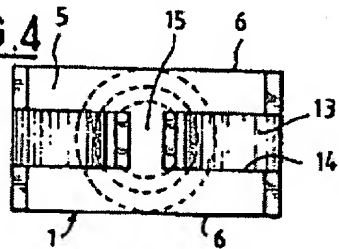


FIG.6

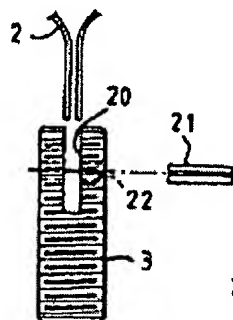


FIG.7

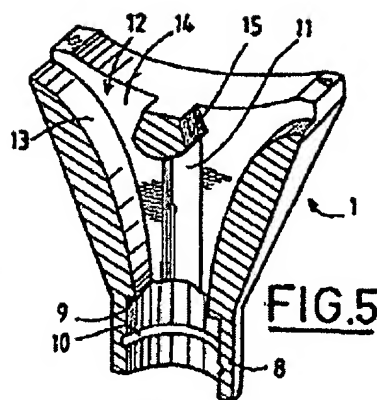


FIG.5

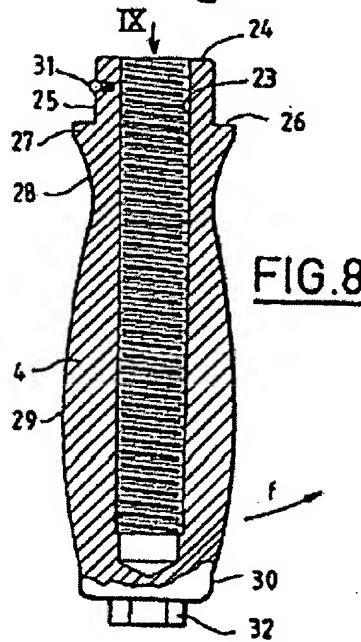


FIG.8

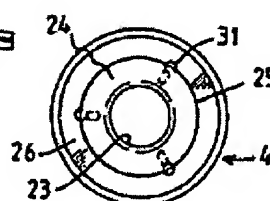


FIG.9

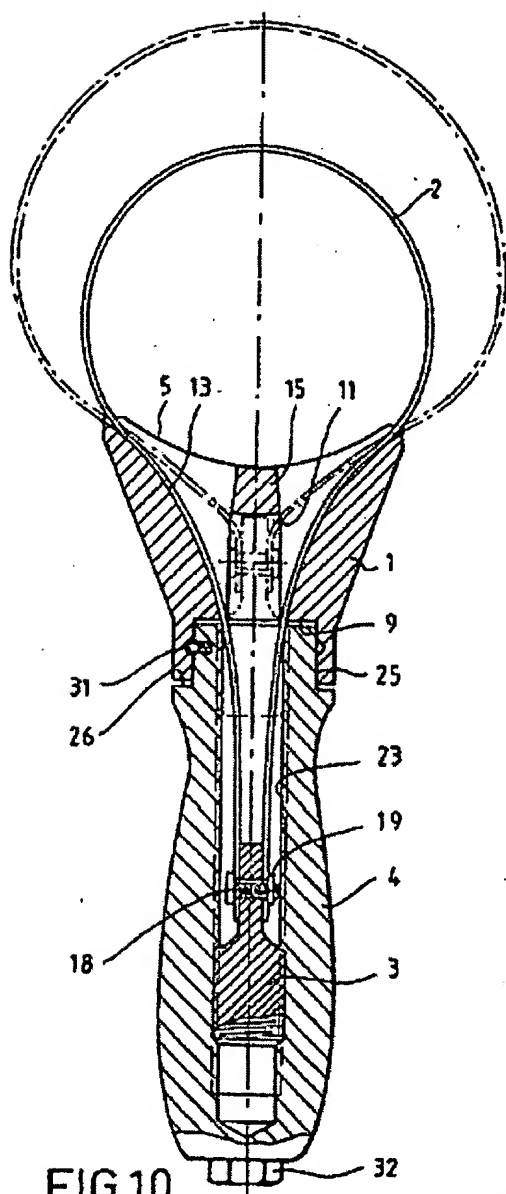


FIG.10

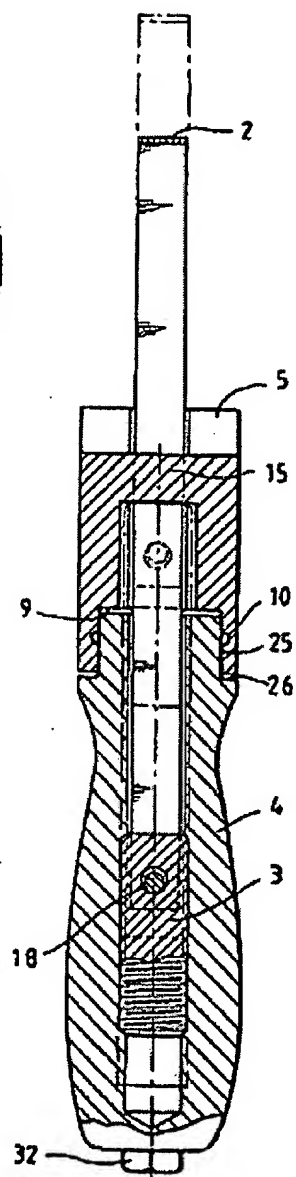
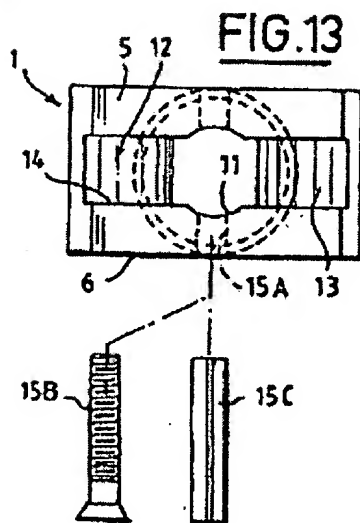
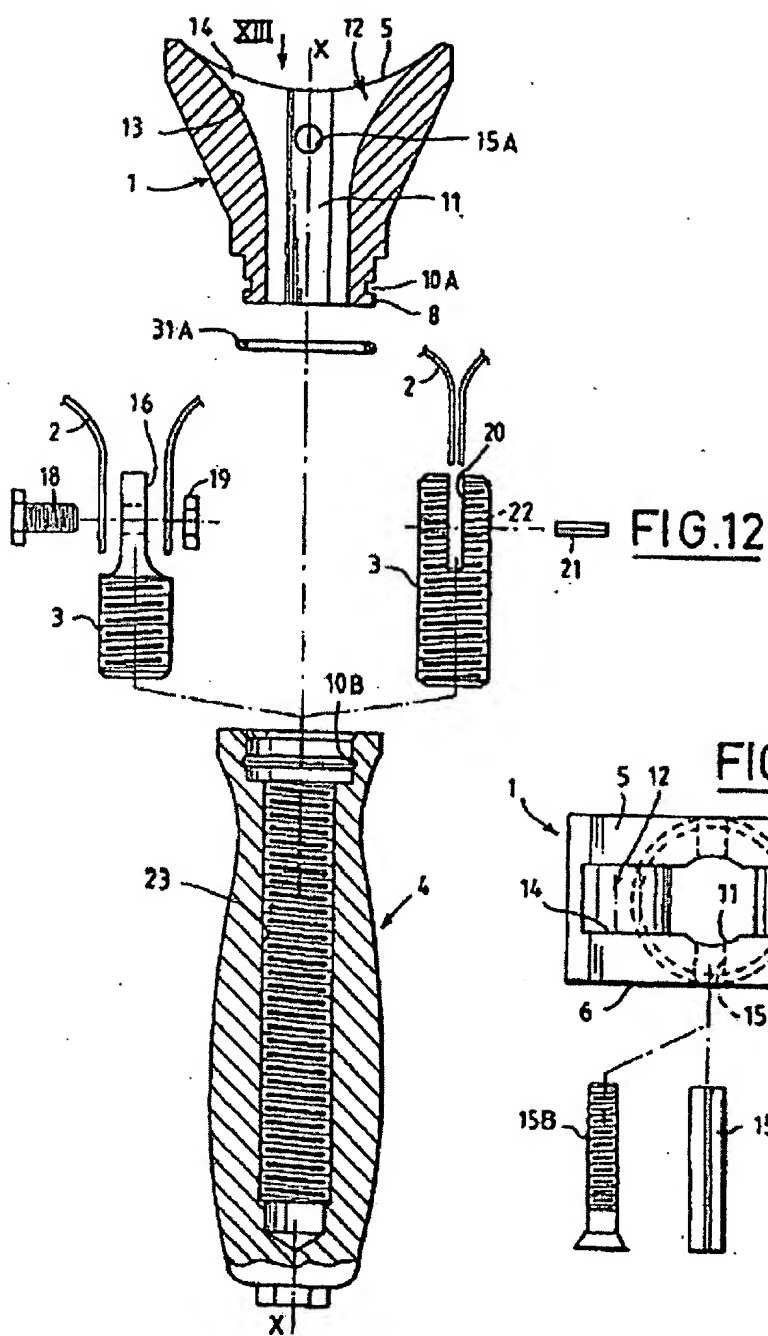
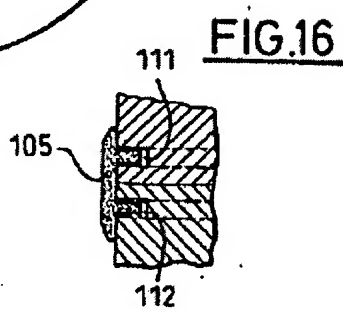
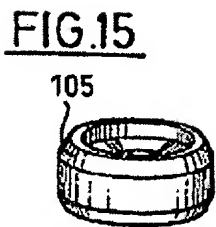
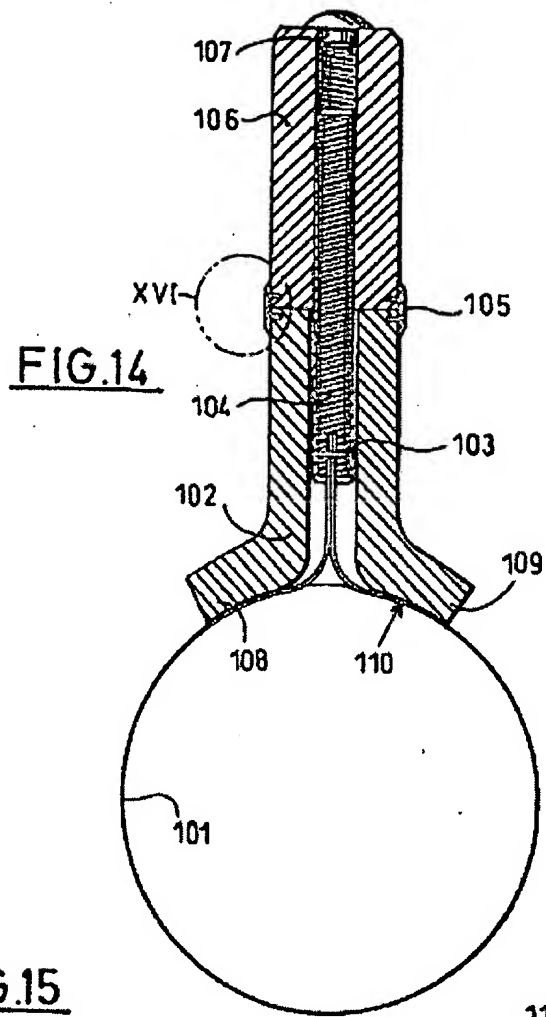


FIG.11





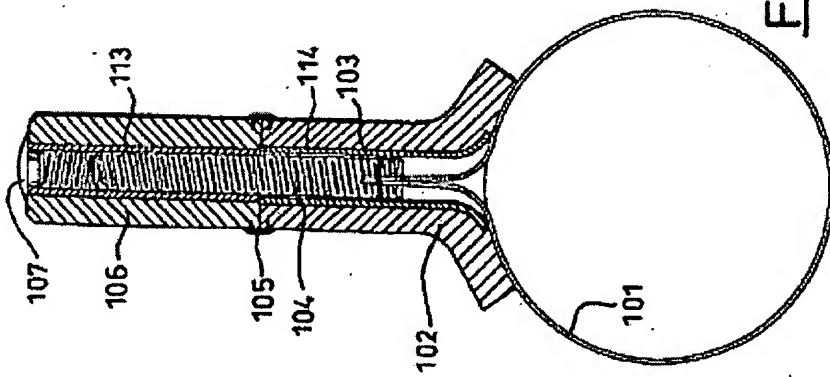


FIG.17

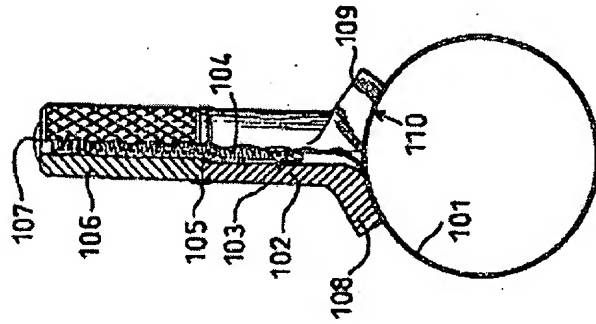


FIG.18

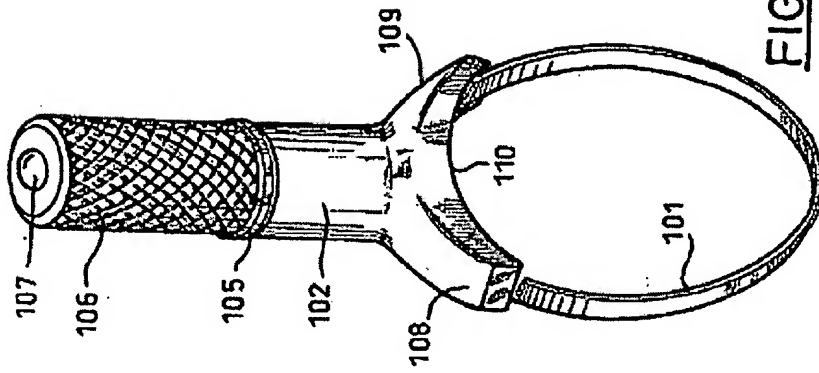


FIG.19

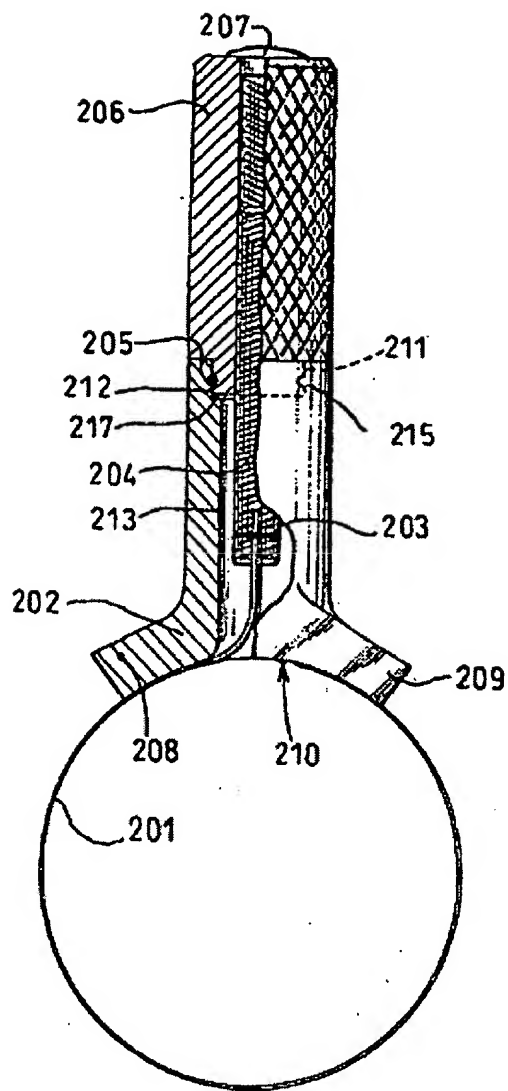


FIG.20

